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ABSTRACT

The follow-up of participants in a longitudinal survey can be difficult and expensive. This paper reviews the experiences of Project TALENT's 11-year follow-up survey of 400,000 individuals tested as high school students in 1960 and the experiences of follow-ups in other longitudinal studies. Methods for minimizing sample attrition and detecting and correcting for nonresponse bias are discussed. A description of the methods used to locate mail survey nonrespondents is included along with analysis of the cost effectiveness of each method. The results of the efforts to reduce attrition and correct for nonresponse bias are analyzed in terms of a measure of general academic aptitude and an index of socioeconomic status. (Author)

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THE FIGHT AGAINST ATTRITION IN LONGITUDINAL RESEARCH

By

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The Fight Against Attrition in Longitudinal Research

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Abstract

The follow-up of participants in a longitudinal survey can be difficult and expensive. This paper reviews the experiences of Project TALENT's 11-year follow-up survey of 400,000 individuals tested as high school students in 1960 and the experiences of follow-ups in other longitudinal studies. Methods for minimizing sample attrition and detecting and correcting for nonresponse bias are discussed. A description of the methods used to locate mail survey nonrespondents is included along with analysis of the cost-effectiveness of each method. The results of the efforts to reduce attrition and correct for nonresponse bias are analyzed in terms of a measure of general academic aptitude and an index of socioeconomic status.

THE FIGHT AGAINST ATTRITION IN LONGITUDINAL RESEARCH*

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Introduction

Longitudinal designs are essential to the study of any process for which individual change or development is of interest. Yet, the longitudinal design is frequently abandoned in favor of retrospective or purely cross-sectional designs because of the time and trouble inherent in longitudinal research. Chief among the troubles encountered in longitudinal research is the problem of maintaining contact with the sample members between surveys. The fight against attrition in longitudinal research is the struggle to eliminate loss of contact with sample members or at least the problems associated with such loss of contact.

Why do we fight attrition? To a certain extent we need to maintain as large a sample as possible in order to provide sufficiently stable sample statistics, that is, to keep random sampling errors at a minimum. The most urgent concern, however, is the prevention of the systematic biases of population estimates that are almost surely associated with sample attrition. The tendency to "drop out" of a longitudinal survey is frequently correlated with key survey variables such as socioeconomic status or academic abilities and almost always correlated with mobility. Examples of such bias are given later in this paper.

This paper describes the fight against attrition that has been part of the Project TALENT 11-year follow-up survey and is part of the planning for the TALENT 17-year follow-up survey. Conceived in the late '50s, Project

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TALENT got underway with the nationwide testing of over 400,000 students in over 1,000 high schools in 1960. Each student was given a 2-day battery consisting of an interest inventory, numerous tests of aptitude and demonstrated abilities, a personality inventory, and a 400-item questionnaire covering the student's background, current activities, and plans for the future. Table 1 shows the timing of follow-up surveys, including the 17-year post-high school survey now being planned.

Table 1

Modal Age of Respondents in Relation to TALENT Data Collection Schedule

Data Collection Date	Grade in 1960				Data Collection Effort
	12th	11th	10th	9th	
1960	17½	16½	15½	14½	Initial Testing
1961	19				
1962		19			1-Year Follow-Up
1963			19		
1964				19	
1965	23				
1966		23			5-Year Follow-Up
1967			23		
1968				23	
1969					
1970					
1971	29				
1972		29			11-Year Follow-Up
1973			29		
1974				29	
1975					
1976					
1977	35	34[a]	33[a]	32[a]	Proposed
1978	36[b]	35	34[b]	33[b]	17-Year Follow-Up
1979	37[c]	36[c]	35	34[c]	
1980	38[d]	37[d]	36[d]	35	

Note. All dates are for the Fall except the 1960 testing which was in the Spring.

[a]Control samples of 1,000 cases to be followed up in 1977.
[b]Control samples of 1,000 cases to be followed up in 1978.
[c]Control samples of 1,000 cases to be followed up in 1979.
[d]Control samples of 1,000 cases to be followed up in 1980.

The first section of this paper describes factors influencing response rates for mail surveys. This is followed by a discussion of address maintenance techniques designed to prevent attrition. The third section discusses the Project TALENT approach for detecting and correcting nonresponse bias, and the concluding section discusses some implications for the design of longitudinal surveys.

Preventing Attrition

Mailed Questionnaires

The ubiquity of mail surveys stems mainly from their relatively low cost. Questionnaires can easily be mass produced and mass mailed. No travel, telephone, or personnel time is required to collect the data. The primary problem associated with such surveys is in obtaining the participation of the intended respondents. The impersonal nature of a mailed questionnaire does not go far in eliciting a feeling of commitment or sometimes even interest in its recipient. Those that do respond to such surveys tend to be more able and more well-to-do than those who do not, thus introducing bias that jeopardizes the potential generalizability of the survey results.

The return rates for mailed questionnaires will vary widely depending on characteristics of the target population and the perceived importance of the survey. One particularly salient determinant of the response rate is the ease of response. Sewell and Hauser (1975) report a rate of over 84% to a postcard survey requiring only 4 or 5 responses. Babbie (1973) suggests that response rates as low as 50% of the delivered questionnaires are acceptable and rates as high as 70% are "very good."

Table 2 shows the overall response rates to the mailed Project TALENT follow-up surveys. Post Office returns provide a lower bound for estimating the number of nondeliverables due to obsolete addresses. A second estimate

Table 2

Overall Mail Survey Response Rates
for Project TALENT follow-ups

	1-Year Follow-Up	5-Year Follow-Up	11-Year Follow-Up
12th Grade	61.9%	37.9%	27.9%
11th Grade	47.0%	35.1%	24.8%
10th Grade	42.5%	31.8%	19.9%
9th Grade	45.5%	27.2%	19.6%

of the number of nondeliverables is based upon the proportion of cases in special telephone surveys of mail survey nonrespondents that were found to be still living at the last known address shown on the TALENT mailer files (the address to which questionnaires were mailed). These estimates indicate that approximately 6% of the remaining valid addresses are lost each year. Table 3 shows the estimated proportion of cases receiving questionnaires and the proportion of these who responded. The relatively low response rates, around 50%, are undoubtedly related to the large amount of information requested. Survey researchers must be conscious of this trade-off between the amount of information requested and the resultant response rate. Sudman and Bradburn (1974) describe determinants of response bias in interview surveys, many of which relate to the partipant's motivation to respond. Other factors such as the persuasiveness of the communication of the survey goals and the clarity of the questions also influence the participant's motivation to respond.

Table 3

Estimated Proportion of Project TALENT Cases
Who Received Their Questionnaires in Each Follow-Up
and Response Rates for These Cases

Grade (Year Surveyed)	Percent of Original Cases With Valid Addresses	Percent with Valid Addresses Responding
1-Year Follow-Up		
12th Grade (1961)	94.0	65.9
11th Grade (1962)	88.4	53.1
10th Grade (1963)	83.1	51.1
9th Grade (1964)	78.0	58.3
5-Year Follow-Up		
12th Grade (1965)	73.4	51.6
11th Grade (1966)	69.0	50.9
10th Grade (1967)	64.8	49.0
9th Grade (1968)	60.9	44.7
11-Year Follow-Up		
12th Grade (1971)	50.6	55.1
11th Grade (1972)	47.5	52.2
10th Grade (1973)	44.7	44.5
9th Grade (1974)	42.0	46.7

A second important determinant of response rate is the persistence of the survey staff. Sewell and Hauser (1975) sent four separate waves of questionnaires. If they had relied on only one mailing, the response rate would have been only 51.8% rather than the 84.2% obtained from all four waves combined. A similar experience with the TALENT 11-year follow-up of the 11th and 9th grade cohorts is shown in Table 4.

Table 4

Proportion of Project TALENT Follow-Up Cases Responding to Each Mailing Wave*

	Males		Females	
	Percent This Wave	Cumulative Percent	Percent This Wave	Cumulative Percent
11th Grade 11-Year Follow-Up				
1st Wave	13.1	13.1	15.6	15.6
2nd Wave	4.3	17.4	4.1	19.7
3rd Wave	4.3	21.7	3.8	23.5
4th Wave	2.8	24.5	2.3	25.8
9th Grade 11-Year Follow-Up				
1st Wave	11.8	11.8	12.7	12.7
2nd Wave	3.7	15.5	3.1	15.8
3rd Wave	2.3	17.8	2.1	17.9
4th Wave	1.8	19.6	1.6	19.5

*Based on 1960 Weights A which adjust for the differential sampling rates in the original design.

Address Maintenance

By the time of the 11-year follow-up survey, current addresses were available for only about 50% of the original Project TALENT participants. At this time virtually all of the participants had moved from their residence in 1960 during high school, and 90% of the women had married at least once, most of them changing their name as well as their address. The intense mobility of this age group is in marked contrast to that of the parents of high school students surveyed in the 1964 Wisconsin study follow-up (Sewell and Hauser, 1975). In light of such mobility, the attrition rate, while not entirely acceptable, seems quite good.

Because of the very large sample size, only very inexpensive address maintenance techniques can be applied to the whole sample. The primary mechanism for address maintenance has been an annual locator letter, the Project TALENT News. The Postal Service maintains address changes for one year. Thus whenever a change-of-address form is supplied to the post office by a TALENT participant, the next copy of the annual locator letter should reach the post office before the address update expires.

The locator letters are stamped "address correction requested" so that the post office will notify Project TALENT of any address changes. (It should be noted that the fee for this service increased dramatically last year, from 13¢ to 25¢ for each correction.) In addition, the TALENT News has included a cutout form that the participant can use to notify Project TALENT directly of any future address change. The TALENT News also provides an opportunity to inform the participants of the plans for future studies and results from prior studies based on the data that they have provided. It thus serves the secondary purpose of maintaining the respondents' motivation to participate in future follow-up surveys.

Other address maintenance techniques have been used wherever possible.

Correspondence with high school class reunion coordinators has yielded a number of updated address lists for particular schools and classes. Occasionally participants will see articles on TALENT in the news, such as the article in the August 27, 1975 issue of the New York Times, and write in requesting information on their original test scores, thus providing current addresses.

Detection and Correction of Nonresponse Bias

Special Nonrespondent Surveys

It is evident that participants whose address has been maintained and who respond to a mailed questionnaire tend to be more literate and more in sympathy with the goals of social science research than those from whom responses are not obtained. Sewell and Hauser (1975) found that both the parents who responded and their children were brighter, better educated, and more well-to-do than their counterparts who did not respond. In their case the overall response rates were high enough that the effects of such biases were negligible. For Project TALENT the effects of such biases are more serious.

In order to assess the extent of nonresponse bias and provide for its correction, Project TALENT staff have conducted an intensive telephone survey of a sample (typically 4%) of the nonrespondents to each mail survey. Because such samples have included on the order of 2,500 cases rather than the 100,000 targeted for each mail survey, the project has been able to use more expensive procedures for locating and interviewing sample members.

Initially the special nonrespondent surveys were conducted by regional coordinators located near the schools tested in 1960. Difficult-to-locate cases were turned over to a retail credit organization. As the TALENT participants have become more dispersed, however, it has become more effective to handle most of the locating and interviewing through an inhouse staff.

Armed with a multitude of information sources, each of these locator-interviewers has become a veritable Sherlock Holmes. In the past three surveys 91% of the nonrespondents in the special sample have been located. Interviews have been obtained from over 90% of those located (about 7% refused to participate and 1% were found to be deceased).

A brief description of each of the major data sources used in locating nonrespondents is given in Attachment 1. Table 5 shows the usage, cost, and effectiveness for each of the key data sources. This analysis will be helpful in maximizing the cost-effectiveness of future locating efforts. It should be emphasized, however, that the success of various strategies may vary widely with characteristics of the sample. Much of the success with nontrivial cases is heavily dependent on two key pieces of information collected in 1960. The respondent's birthdate is used in searching several information sources, particularly Department of Motor Vehicles records. The parents' names have also been critical in a large number of cases. The parents are generally more settled and much easier to locate than the participants themselves, and they almost always can and will provide the participant's current address.

Nonresponse Bias

The 11th and 9th grade 11-year follow-up data have been analyzed to illustrate the nonresponse bias present in both the mail and telephone surveys and the two somewhat different methods that have been used to correct for this bias. Table 6 shows the means and standard deviations on two key variables for the entire 1960 sample and for the mail respondents, telephone respondents and telephone nonrespondents. For each grade and sex the mail survey respondents have higher averages on both the general academic aptitude composite and the socioeconomic index than the 1960 sample as a whole.

Table 5

Cost-Effectiveness for Each Locating Procedure
Used in Project TALENT's Special Nonrespondent Surveys[a]

Locating Procedure	Number of Times Used	Cost-Effectiveness Factors		
		Percentage of Cases Resulting in Key Leads	Estimated Cost Per Each Use of Method[b]	Cost-Effectiveness[c]
Telephone Directory	1,539	31	.33	1.06
Information Operator	3,265	52	.33	.63
Parents/Relatives	1,492	87	1.38	1.59
City Directory	796	30	1.65	5.50
Neighbors	153	48	1.38	2.88
Dept. Motor Vehicles	724	44	2.50	5.68
Post Office	147	75	2.15	2.87
TALENT High School	351	59	1.75	2.97
Transfer School/College	244	46	1.65	3.59
Classmates	372	19	3.00	15.79
Marriage Bureau	547	32	4.66	14.56
Voter Registrar	90	30	1.38	4.60
Employers	115	57	1.38	2.42
Other[d]	25	84	1.38	1.64

[a] Based on 9th grade 11-year follow-up experience
[b] Includes agency fees, phone, postage, and personnel time
[c] Equals (Estimated Cost Per Each Use of Method) ÷ (Percentage of Cases Resulting in Key Leads)
[d] Includes birth and death records, tax records, utility companies, police departments, etc.

Table 6

Comparison of Project TALENT 1960 Sample, Mail Respondents to Follow-Ups, and Special Sample Members on Academic Aptitude and SES

	11th Grade				9th Grade			
	Males		Females		Males		Females	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
General Academic Aptitude								
1960 Sample	509.2	126.2	509.8	116.1	430.2	119.5	453.6	110.6
11-Year Follow-Up Mail Respondents	555.8	115.4	549.9	104.7	488.6	111.6	507.3	100.9
Special Respondents	497.6	129.5	507.0	111.7	424.8	116.3	449.7	108.5
Special Nonrespondents	478.4	113.9	461.1	113.4	389.1	114.1	398.4	100.0
Socioeconomic Index								
1960 Sample	98.2	10.1	97.9	9.9	96.5	10.5	96.5	10.3
11-Year Follow-Up Mail Respondents	100.0	9.6	99.7	9.1	99.1	10.0	99.1	9.7
Special Respondents	98.2	9.7	97.7	10.0	96.6	10.8	96.0	10.2
Special Nonrespondents	95.9	9.8	95.2	10.6	94.6	11.1	93.9	10.4

Similarly, the special telephone sample respondents have consistently higher averages than the nonrespondents.'

Table 7 shows the approximate bias and standard error for three methods of estimating population values of general academic aptitude and 1960 socioeconomic status from follow-up sample data. The bias is estimated by the difference between the follow-up sample estimate and the corresponding estimate based upon a random 10% sample of the 1960 cases (even though this difference may be due in part to sampling error). The estimated standard errors are based upon the tenuous assumption that the decrease in standard error related to the initial stratification variables is roughly balanced by the increase due to the clustering of cases by school in the initial multistage sampling design. (See Wise, McLaughlin, and Steel, 1977 for a more complete description of the initial sampling design.)

It is clear that estimates based upon the mail survey alone are highly biased for both general academic aptitude and socioeconomic status. The first level of correction is obtained by multiplying the case weights of special sample respondents to make them stand for all nonrespondents. (If 1/25 of the mail nonrespondents were included in the special sample, then the weight for each special sample respondent would be multiplied by 25.) The assignment of heavy weights to the special sample respondents increases the sampling error somewhat, but greatly reduces the bias.

For many purposes the first level of correction may be adequate. Two methods of reducing the bias due to nonresponse within the special sample have been developed. (Of course for the variables in the illustration one could just use the 1960 data on the 11-year nonrespondents. These procedures are designed to correct for nonresponse in the follow-up variables which are not available for the nonrespondents.) The first procedure, developed by Shaycoft (see Appendix A of McLaughlin, Fulscher, and Yen, 1974), involves matching each nonrespondent to one or more respondents who are similar on

Table 7

Approximate Bias and Standard Error for Three Methods of Estimating Population Values of General Academic Aptitude and Socioeconomic Index from Project TALENT Follow-Up Data

	11th Grade Males			11th Grade Females			9th Grade Males			9th Grade Females		
	Means		Standard Deviation	Means		Standard Deviation	Means		Standard Deviation	Means		Standard Deviation
	Estimated Bias	Approximate Standard Error	Estimated Bias	Estimated Bias	Approximate Standard Error	Estimated Bias	Estimated Bias	Approximate Standard Error	Estimated Bias	Estimated Bias	Approximate Standard Error	Estimated Bias
General Academic Aptitude												
Estimates Based on Mail Respondents Only	.369σ	.010σ	.085σ	.345σ	.010σ	-.098σ	.488σ	.011σ	-.066σ	.486σ	.011σ	.087σ
Estimates Including Special Respondents	.036σ	.025σ	.017σ	.084σ	.024σ	-.040σ	.078σ	.022σ	-.010σ	.085σ	.022σ	-.010σ
Estimates Including Correction for Special Nonrespondents	.005σ	.025σ	.010σ	.030σ	.024σ	-.028σ	.018σ	.023σ	-.006σ	.011σ	.023σ	.003σ
Socioeconomic Index												
Estimates Based on Mail Respondents Only	.178σ	.010σ	-.050σ	.182σ	.010σ	-.081σ	.248σ	.011σ	-.048σ	.252σ	.011σ	-.058σ
Estimates Including Special Respondents	.050σ	.025σ	-.040σ	.030σ	.024σ	-.010σ	.067σ	.022σ	.019σ	.019σ	.022σ	-.019σ
Estimates Including Correction for Special Nonrespondents	.030σ	.024σ	-.030σ	.000σ	.024σ	-.010σ	.038σ	.023σ	.019σ	-.010σ	.023σ	-.010σ

the basis of 9 key 1960 variables. The nonrespondent's weight is then reassigned to the matching case(s). The third level of estimates for the 11th grade cohort in Table 7 reflects this approach.

A somewhat simpler method is shown as the third level of estimates for the 9th grade cohort. The 9th grade special sample was based on a stratification on academic aptitude and on the proportion of minority students in the 1960 high school (since race was not ascertained in 1960). This allowed for an oversampling of minority cases. The weights of the nonrespondents in each of the resulting 16 cells are redistributed over the special sample respondents in the cell.

Both of the two procedures bring the bias down below the level of the standard error for the two variables studied. Further analysis is needed, however, of the effects of these procedures on other estimates, particularly those involving follow-up variables.

Summary

The fight against attrition may be viewed as a three-way tug-of-war between cost, amount and complexity of the data to be collected, and overall response rate. For a survey the size of Project TALENT a large number of responses to a complex questionnaire can be obtained for as little as 50¢ per sample case. Because the rate of response will be low, however, the cost per usable response may be as high as $2.50 and there will be heavy systematic biases between the respondents and the general population. By spending up to $50 per response to locate and interview participants, a response rate as high as 90% can be obtained, eliminating nonresponse bias for all practical purposes.

Careful planning is needed to achieve as high a response rate as possible for a fixed cost and questionnaire complexity (or to achieve as low a cost as

possible for a fixed response rate and questionnaire complexity). Resources must be allocated for maintaining current addresses, for evaluating the questionnaire form and mode of mailing, for locating some or all of the nonrespondents and obtaining additional responses, and for employing statistical corrections for nonresponse bias. A great deal of effort has been put into developing the strategies outlined above for Project TALENT, but these strategies can only be a starting point in planning for surveys with different sample or content characteristics.

References

Babbie, Earl R. Survey research methods. Belmont, Calif.: Wadsworth Publishing Company, 1973.

McLaughlin, D. H., Fulscher, G. V., & Yen, W. M. Project TALENT's special sample: Is it necessary? Palo Alto, Calif.: American Institutes for Research, 1974.

Rossi, R. J., Wise, L. L., Williams, K. L., & Carrel, K. S. Methodology of the Project TALENT 11-year follow-up study. Palo Alto, Calif.: American Institutes for Research, 1977.

Sewell, W. H., & Hauser, R. M. Education, occupation and earnings: Achievement in the early career. New York: Academic Press, 1975.

Sudman, S., & Bradburn, N. M. Response effects in surveys. Chicago: Aldine, 1974.

Wise, L. L., McLaughlin, D. H., & Steel, L. The Project TALENT data bank handbook. Palo Alto, Calif.: American Institutes for Research, 1977.

ATTACHMENT I

SUMMARY OF INFORMATION SOURCES USED IN LOCATING NONRESPONDENTS

IN-HOUSE RESOURCES

The following is a discussion of the information available from and a description of how to use resources internal to Project TALENT:

1. Alphabetical Directory
2. Numerical Master File
3. One-Year Mailer File
4. Z-Sheet (1960 name and address sheet)
5. Numerical and Alphabetic TALENT School List and School Directories
6. Telephone Book Collection
7. Area Code Books
8. Zip Code Books
9. Almanac
10. Road Atlas, Maps
11. Haines Directory
12. A Number of Reunion Class Lists
13. List of Classmates Who Responded to Questionnaire
14. Marriage Bureau Record File
15. Department of Motor Vehicles File
16. MT/ST
17. One-and Five-year Data

Alphabetic Directory. The Alphabetic Directory lists alphabetically all TALENT participants. The following information is included: Identification number, school code, 1960 address, sex, birthdate, and age. This directory is used to quickly determine if the address on the label is the same or different from the 1960 address. Brothers and sisters can be identified by matching addresses. Often a brother is easier to trace than a female nonrespondent because of name change.

Numerical Master File. The Numerical Master File lists numerically all TALENT participants. Also included is the following information: birthdate, father's name, mother's name, grade and school code. This directory is used to supplement identifying siblings and relatives attending the same school.

One-Year Mailer File. The One-Year Mailer File lists numerically 10th grade TALENT participants only. Included information is: 1963 name and address (address to which 1-year follow-up questionnaire was sent), 1960

name and father's name. Since the file is arranged numerically, schools and classes are together; it is not difficult to determine classmates who were neighbors simply by comparing addresses. The 1963 address, if different from the 1960 address, could be a college address or an address indicating relocation of the entire family. A name difference between the 1960 and 1963 name in a female often pinpoints a time period in which her marriage occurred.

Z-Sheet. The Z-Sheet is the original form filled out at the time of testing in 1960 by TALENT participants. These sheets are on microfilm. The students first printed information on the Z-Sheet and then put it on grids. Occasionally errors occurred in this transfer of information (e.g., coded incorrect letters or numbers, skipped grids, address too long to be picked up when scanned, etc). The Z-Sheet was used to verify the information on the label before any request was sent through an agency (DMV or Marriage). The following information can be found on the Z-Sheets: name, birthdate, grade, sex, school, school location, and 1966 address.

Numerical and Alphabetical TALENT Schools and School Directories. The numerical TALENT Schools list contains the range of Identification numbers for a school, the school code, the name of the school and location. Occasionally a school name is missing from the label. The school can be determined by checking the Identification range. The Alphabetic TALENT Schools list is arranged alphabetically by state, and alphabetically by city within the state. The school code is also included. Also available are numerous school directories. These directories assist in locating school addresses and phone numbers and in determining school districts. Many 1960 schools no longer exist, have changed their names, or have consolidated with other schools. The central school district office can supply information regarding the whereabouts of records for any of their schools.

Telephone Book Collection. Over the past several years Project TALENT has collected almost 500 telephone books for all parts of the United States, particularly for places where TALENT originally tested. Each phone book is assigned a number and is kept shelved in order. A card system has been set up to facilitate identification of the correct book for any given city. Cards are filed alphabetically by city name regardless of state, and include the number of the book(s) in which the city is listed as well as the

different dates of issue of the books.

Area Code Books. The telephone company has supplied Project TALENT with an extensive number of area code books. These are used to determine an area code for any given city.

Zip Code Book. The Zip Code Book can be of assistance in determining the general location of towns that are not listed in the atlas. Also, all address updates need zip codes.

Almanac. The Almanac is used to determine what county a town or city is in, as well as the county seat. (County records are kept at the county seat.)

Road Atlas, Maps. It is often important to know the geographic location of a particular city or town. Telephone books and information operators do not necessarily cover all local or nearby towns. Map reading expands the area in which the initial search began. Maps and atlases assist in determining counties, location of nearby cities and nearby counties in which to expand the area of search.

Haines Directory . Haines Directory Service, located in San Francisco and Lincoln, Nebraska, carries current reverse street-telephone directories for various cities throughout the United States. All addresses are listed by street, then by house number. Names and telephone numbers are given for each address. For a service charge, Haines provided the TALENT in-house staff with the names of current residents and a phone number at a given address, as well as neighbors' names, addresses and phone numbers. Haines is used primarily for areas in which TALENT does not have access to city directories, such as New York City, Los Angeles, and Chicago.

Reunion Class Lists. The TALENT phoning staff has collected a number of 10 and 15 year Reunion lists for some TALENT schools. Information usually included maiden and married names, occupation of participant and spouse, number of children and address at the time of the class reunion.

List of Classmates Who Responded to Mailed Questionnaire. This is a list of all TALENT participants from each school who responded to the regular mailed questionnaire. The list contains their most current address, name, and Identification number. Classmates can be easily located and contacted from this list.

Marriage Bureau Record File. The marriage bureau record file was established in 1973 amd continued to grow through the end of the 11-year follow-up. New information was constantly being added and updated as the phoners contacted various agencies. This file provides information regarding the accessibility to marriage records throughout the United States. The information included the following: area covered (i.e., state, county, city records);

name, address and phone number of the agency; whether information can be obtained via phone or letter; amount of fee, if any; and how records are maintained (e.g., can records be checked if only name of bride/and or approximate date of marriage is provided). The cards are arranged alphabetically by city or county within the state. This system saves time and money as the phoners did not have to call a particular agency each time they were requesting information.

Department of Motor Vehicles File. The Department of Motor Vehicles file contains a complete list of addresses of various state DMV Agencies as well as the amount of fee, if any, for obtaining a driver record for that state.

MT/ST Form Letters. Air has a magnetic Tape Selectric Typewriter (MT/ST) which is capable of playing out a letter that has been recorded on tape. In the search for nonrespondent sample members, external agencies often request a letter prior to the release of information. So as to expedite this release, 31 different letters were recorded on tape. Then when it was necessary to send a letter requesting a particular type of information from an agency, the MT/ST was used to produce the appropriate request form. A typist printed out the letters on a daily basis thus providing continuity in mail requests.

Background Data from 1- and 5-year follow-up surveys. To aid the in-house staff in locating 10th and 9th grade nonrespondent sample members, the following data collected for the one- and 5-year follow-up surveys were reviewed: year married (if prior to the 5-year follow-up); military status; undergraduate and graduate colleges attended; parents; and social security number.

EXTERNAL INFORMATION SOURCES

The following section presents the external information services available to the in-house staff and describes the main features and uses of each service. In addition to the 14 services listed, three others (utility company records, police records, and wage, tax, and personal property tax records) were occasionally used.

1. Telephone directories
2. Information operators
3. Parents and relatives
4. Department of Motor Vehicles
5. Marriage bureau records
6. TALENT high schools
7. Transfer schools, colleges
8. City directories
9. Post office
10. Voter registration records
11. Employers
12. Former classmates
13. Birth/death/divorce records
14. Neighbors

1. Telephone Directories. Project TALENT has developed a collection of nearly 500 directories of cities and towns throughout the United States. This collection focusses on those areas where Project TALENT originally tested. As the first step in finding a nonrespondent, the locators would check telephone directories from the area near the nonrespondent's 1960 (or last known) address for (1) the nonrespondent, (2) his/her father, (3) a person with the same last name at the 1960 or last known address, and (4) a person with the same last name if it was uncommon and the directory had few listings for it.
2. Information Operators. Not only did the operators have access to directories for every city and town in the U.S., but they also had more current information than was in the telephone books. Locators checked with operators for the same information that they looked for in telephone books. Information operators provided two extremely useful services: (1) checking directories of surrounding areas as well as the city or

town asked for, and (2) informing locators if a nonrespondent had a phone with an unpublished (i.e., unlisted) number.

3. Parents and Relatives. Parents of participants tended to be more settled than their children and consequently were easier to locate. They often proved to be the most critical and direct link in the attempts to contact a nonrespondent. Other relatives proved useful, too, although they were generally helpful in establishing contact with the parents, who, in turn, were helpful in establishing contact with the nonrespondent.

4. Department of Motor Vehicles. (DMV) Most states' DMV records are public information, available for a nominal fee. All DMV requests were made by letter and required an exact spelling of the person's name and his/her specific birth date. TALENT developed a file on particular requirements (e.g., fees, addresses, etc.) for using DMV records. Since males drive cars and seldom change their names, DMV records proved to be one of the most effective means of locating them. A search of DMV files records covered the entire state in which the nonrespondent might live, and, while not always providing a current address, many times the search could supply the last known address or indicate to which state the nonrespondent might have moved. After checking the TALENT alphabetical file (see in-house facilities) to determine if a nonrespondent had any siblings, locators could search DMV files for brothers of nonrespondents.

5. Marriage bureau records. Project TALENT maintained an information file on marriage bureaus. This information included how its records are kept and what data it required to begin searching its records, e.g., groom's name only; both bride's and groom's names; the exact date of marriage; race; or approximate location of marriage by county, amount of fee, address of agency, etc. The most useful function of marriage records was providing a current name for a female nonrespondent. The locators generally requested a search covering the period of time in which most females married (18-23 years of age). Marriage records provided some (or all) of the following information: (1) the name of bride and groom; (2) the exact date of marriage; (3) birthdate; (4) addresses; (5) occupation; (6) parents' full names; (7) names of witnesses; and (8) name and address of the person performing the ceremony. The most critical information, obviously, was the husband's name, which provided

data for a search of DMV records.

6. Schools tested by TALENT. From school records, a locator could sometimes determine if a nonrespondent had graduated or transferred to another high school, if he/she attended college (and where), and which potential employers requested transcripts. Other items of information provided by high schools were: (1) father's name and middle initial; (2) father's occupation, (3) mother's first name, (4) nonrespondent's place of birth, and (5) name and birth dates of siblings. Locators experienced difficulty in obtaining information from some schools as a result of the Buckley Amendment, because guidelines have not yet been established for the Act, with the result that some schools refuse to release information without the written permission of the former

7. Other schools and colleges. If TALENT nonrespondents had transferred to a TALENT high school from another school (or vice versa) the other school could provide information similar to that given by the TALENT high school. (see above) Additionally, information obtained from colleges was extremely useful, primarily because it was fairly recent. Alumni offices often had current addresses for nonrespondents. Other information supplied by colleges was: (1) female nonrespondents' married names; (2) spouse's name; (3) address at the time of graduation; (4) social security numbers; and (5) if the nonrespondent had transcripts sent to any graduate schools or employers. The same difficulties resulting from the Buckley Amendment's effect on TALENT high schools were encountered in contacting the other schools and colleges.

8. City Directories. This efficient resource tells who lives at a particular address, what his/her occupation is, the spouse's name, the telephone number, and the names and telephone numbers of neighbors. Most libraries and chambers of commerce have city directories. Information can be checked either by a name or by an address. City directories were most useful in verifying an address and providing phone numbers. Old city directories could be used to find out the occupation in 1960 fo the nonrespondent's father. Furthermore, they provided a means for calling old neighbors to ask if they knew anything about the nonrespondent or his/her family.

9. Post Office. Any U.S. Post Office will send a forwarding address for a $1.00 fee. The major drawback to this method is that forwarding

addresses are only kept on file for one year.

10. Voter Registration. Voter registration was used to find out if the nonrespondent still lived within a particular county. In addition to providing an address, voter registration sometimes supplied the date of birth, occupation and name of employer, spouse's name, and date when the person last registered to vote. The amount of information given out varied from county to county with some counties refusing to release any information at all.

11. Employers. In some cases, the locator would contact an employer when there was no other way to contact a nonrespondent. This frequently led to interviewing the nonrespondent at his/her job. If the nonrespondent didn't work for a particular employer any more, sometimes the employer could provide a forwarding address or a new place of employment for the nonrespondent.

12. Classmates. Former classmates of nonrespondents helped locators determine if there had been a class reunion and how successful the reunion committee may have been in contacting former classmates. Even if there had been no reunion, classmates sometimes knew what happened to a nonrespondent and could provide information on his/her relations, current address, or employment.

13. Birth/death records. If a locator had found information about the nonrespondent's place of birth, it was possible to use birth records to find out the parents' first names, their place and date of birth, and siblings names and birthdates. Sometimes birth record information led to a new area in which to search for relatives. If a locator had determined that a nonrespondent's parent (or other relative) had died, death records often provided information such as the names of survivors, and their last known addresses.

14. Neighbors. Neighbors were contacted when a nonrespondent was found either to have an unlisted phone number or to have no phone at all. By receiving a message for the nonrespondent to call AIR back, neighbors were frequently the critical link in making contact with a nonrespondent. Also former neighbors who were contacted sometimes provided leads about where the nonrespondent or his/her family had moved.